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Journal of the Society of Arts.

FRIDAY, DECEMBER 31, 1869.

Announcements by the Council.

Office Arrangements.

The Council have decided to create a new office, that of Inspector of the Educational Department, and have selected for this appointment Mr. Critchett, who has been, for thirteen years, Assistant Secretary. The latter office will not be filled up.

Collection of Engravings and Prints.

The collection of prints produced by various processes, used to illustrate Mr. Davenport's paper, "On Prints and their Production," read on Wednesday evening, the 8th instant, will be open for the inspection of members and their friends, between the hours of 10 and 4 o'clock, up to Saturday, the 8th January, 1870, inclusive.

Lichtdrucks.—Some examples of prints produced by a process described as Lichtdruck have been added to the collection, a brief account of which will be found at page 134.

Donations to the Library.

The following works have been presented to the Library, and the thanks of the Council have been communicated to the donors :—

The Elements of Building Construction and Architectural Drawing, by E. A. Davidson ; presented by the author.

Report of the Educational Congress held at Manchester, November, 1869 ; presented by the National Education Union.

R. Museo Industriale Italiano. Illustrazioni delle Collezioni. Didattica. Parte Prima : Libri Scolastici e Pedagogici, nonche per uso di premio relazioni relative all' insegnamento cenni relativi all' istruzione ne' singoli paesi ; by Cav. G. Jervis ; presented by the author.

The Illustrated Farmer and Gardener's Almanack for 1870.

Subscriptions.

The Christmas subscriptions are due, and should be forwarded by cheque or Post-office order, crossed "Coutts and Co.," and made payable to Mr. Samuel Thomas Davenport, Financial Officer.

SILK CULTIVATION IN ENGLAND.

By Alexander Wallace.

Public attention was directed to the cultivation of the mulberry silkworm in this country by the paper recently read before the Society of Arts by Thomas Dickens, Esq., President of the Silk Supply Association. Allow me to add a few remarks on this most important subject, which I trust will at once be thoroughly investigated by practical experiment over extended areas in Great Britain. It is needless to remark that could such an industry as that mentioned be introduced, it would confer an enormous benefit on our agricultural and manufacturing population, especially on women and children ; we may, therefore, find it worth while to reopen the subject, which has lain dormant for the last forty years, and reconsider if the experiment, which was then abandoned as only partially successful, may not now be revived with more chance of success. Referring to the last experiment in mulberry silkworm culture, we find it stated in Dr. Lardner's "Cabinet Cyclopædia," "Silk Manufacture," page 40, published in 1831, that "In 1825, a company was formed, under the title of the British, Irish, and Colonial Silk Company. This undertaking was supported by characters of the highest rank and respectability, many of whom were induced to give their countenance to the project by a patriotic desire to ameliorate the condition of the Irish peasantry, by adding to their profitable sources of industry. A royal charter was obtained ; about eighty acres of land in the county of Cork were planted with nearly 400,000 white mulberry trees. The whole proved unusually successful, very few trees having died, and many, in the first year of their transplantation, put forth shoots twenty inches in length. A small but complete building for rearing silkworms was adopted on the plan of Count Dandolo. The experiment was repeated on a more limited scale in England. Between 70,000 and 80,000 mulberry trees were planted in nineteen acres of fine rich soil, near Slough. The trees flourished here as well as in Ireland. But the attempt to rear silkworms has been ultimately abandoned by the company. Its managers now turn the whole of their attention to an establishment in the island of Malta. The experience of the company leads to the conclusion that if our moist and variable climate do not in itself offer a sufficient obstacle to the success of attempts at rearing the silkworm, there would still remain another objection, viz., the high price of labour. Silk requires so much care and attention for its production, and so great a number of persons must be employed in an establishment for rearing silkworms, that it is only in countries where the poorer class is great in proportion to capital, and where, consequently, labour must be extremely cheap, that the silkworm can be reared at an expense which offers successfully to compete with other regions. Even then the superior skill and knowledge of people to whom the silkworm has long been an object of attention will always ensure them a superiority over novices in the art. The ignorance and awkwardness of the Irish peasantry in bestowing the necessary attention upon the silkworms afforded sufficient reason for rendering their employment unprofitable to the growers." But since 1825, great changes have taken place in this country and its people. 1. Land has been more thoroughly drained, woods and trees cut down or greatly thinned, and the result is a warmer, drier atmosphere, of which the last item is the most important in mulberry silk culture. 2. The general intelligence of the country has increased. We have now no difficulty in finding skilful and intelligent hands among the working classes. 3. Interchange of ideas, and of communication between distant countries, as also among ourselves, is now effected with rapidity and certainty ; the most approved methods of cultivation, the most skilful treatises, the healthiest eggs may easily be obtained from sericiculturists of repute in all parts of the world. Even now a Japanese pamphlet, on the culture of their mulberry silkworm, printed in August, 1869, at Yokohama, has just been published in the "Guide to Sericiculture," issued by the Silk Supply Association. We approach, therefore, the practical part of the subject with much greater facilities than we possessed in 1825. The objections raised by Dr. Lardner are easily disposed of. 1. With regard to climate—In a magnanerie (or house for rearing silkworms), properly fitted up with modern appliances for regulating the temperature, ventilation, and hygrometric properties of the air, the thermometer and hygrometer may easily be maintained in our climate at the required point, in the months of May, June, and July, without in the least interfering with the necessary amount of ventilation required, and entirely independent of external atmospheric influences. Forty years ago, this, I apprehend, was impossible. 2. The high price of labour, and the number of persons required in a magnanerie, is cited as an obstacle. The rate of wages of the present day in agricultural districts cannot be pronounced high, especially that of women and children, who would be largely employed in tending silkworms; the price, moreover, of silk is relatively now much higher than it was forty years ago. Recent improvements have also greatly minimised the labour required, not merely in reeling the cocoons by aid of machinery, but also in feeding the worms. 3. The third objection, viz., the ignorance and awkwardness of the peasantry of that day, is worth but little now; owing to educational and other changes; the intelligence of the peasantry is far greater now than then, and the fact that there is no lack of skilful and intelligent hands in the manufacturing districts, will go far to prove that awkwardness and ignorance need not now impede the culture of the silkworm. Furthermore, Mr. Dickens's position with reference to the culture of the silkworm in Great Britain is fortified by the opinion of French sericiculturists of known repute. M. Taurigna has stated that we have many localities well suited for the production of seed (eggs), and that we ought to take the highest rank of all European seed-producing countries, our cool climate being especially favourable to the development of sound and healthy races. Mons. Gúerin-Méneville, Inspector General of Sericiculture in France, writes to me as follows:—"Aujourd'hui il est reconnu que l'elévage des vers à soie peut se faire avantageusement dans des pays tempérés, et même froids, et non exclusivement dans le Midi; et l'on commence à développer cette riche industrie dans les départements du Centre et du Nord, dont le climat est peut-être plus rigoureux que celui de' l'Angleterre. Je crois que vous parviendriez facilement à développer cette industrie chez-vous et qu'elle y donnerait de très bons resultats. Pour cela il-faut que quelques proprietaires aises et riches donnent l'exemple à fin que les gens des campagnes le suivent." This opinion, coming from a man who has devoted himself entirely to sericiculture, has published most valuable writing on the subject, and who travels, by virtue of his office, yearly, during the silkworm season, over all the silk districts of France, and reports thereon to the Ministre d'Agriculture, seems to me the strongest *à priori* authority that could be cited for again experimenting in silk culture in England. But, fortunately, we have additional evidence that, so to speak, clinches the matter. For the last three years, Captain Mason, in the vicinity of Farnborough, has, in his magnanerie, reared a thoroughly healthy stock of silkworms of the *B. mori*, obtaining cocoons and silk equal to the best Italian produce. Those which were exhibited at the meeting have been deposited at the offices of the Silk Supply Association, 3, Castle-street, Holborn, and were pronounced most excellent by the members of that association, who were well fitted as manufacturers to express an opinion thereon. When submitted to the judgment of the working men at Macclesfield, the only regret heard was, that there was not enough of it to work in the loom. Capt. Mason has not hitherto been able to furnish us with statistics of the quantity that can be produced from an acre of ground; for this we must wait another year or two, but he informed me that as far as he could judge, from his experience of the last three years, after all expenses had been paid, a profit of £10 per acre, on a plantation of 100 acres, might easily be realised. Captain Mason is a thoroughly practical man, who has, without enthusiasm, tested the feasibility of silkworm culture on about three acres of ground, planted with the white mulberry-tree; his magnanerie is a model of cleanliness, and his devices for preserving the requisite ventilation and temperature are perfect. Were he to turn his attention to the production of healthy seed, instead of cocoons, he could easily make a large profit thereupon. It is chiefly in this direction that I advise that the first efforts of experimenters in sericiculture should be directed. The scarcity, and consequently the high price, of sound eggs (owing to the ravages of the epidemic disease during the last fifteen years), has brought it to pass that in all countries silkworm eggs are eagerly sought for. In Japan, four years ago, cards of eggs, weighing on an average 5-6ths of an ounce each, sold for 1s. 6d. a-piece; then a rush was made to Japan for eggs. In 1865-6 2,000,000 cards were sold; in 1868-9, 2,500,000 were sold, at prices varying from 12s. to 15s. per card. This season, as I learn from a friend in Japan, has been unusually bad, and the quantity of cards is 500,000 only. The natives are holding out for long prices. The cards this year have reached 5 dols., or 21s. 8d. each. At 5s. per oz., which ought to be the normal price, it would pay to grow eggs for sale; at 21s. per oz., the profit would be very great. Of course this price cannot be upheld as soon as competition comes into play, but for beginners in sericiculture it will be a great encouragement to get a good price for their eggs. I could urge further reasons for upholding Mr. Dickens's proposition to attempt a new sericiculture of the *B. mori* in Great Britain, but I think I have stated enough for the present purpose of promoting inquiry and experiment. I will now conclude with a few remarks on a portion of the subject not referred to in Mr. Dickens's lecture. Other races of silk-producing insects have been introduced into Europe with a view to a trial of their produce and acclimatisation. Of these, the ailanthus silkworm, and two or three kinds of oak-feeding silkworms, are all we have made trial of. The ailanthus silkworm may be dismissed from present consideration, for, though easy to rear, and thoroughly acclimatised, the cocoon cannot at present be easily reeled in a remunerative way. The oak feeders from China and North America have been tried only for one or two seasons, and we cannot yet speak confidently about them. The oak feeder from Japan, the *Bombyx yama mai*, which was at one time monopolised by the Royal family, and considered so precious, that the penalty of death was threatened on any one exporting its eggs, was introduced into Europe in 1863, and though a considerable check has been experienced in its culture, one individual, most successful from the first, has achieved a marked success. M. le Baron de Bretton, of Vienna, beginning five years ago with a few eggs, has this season reared the *Yama mai*, in the oak woods on his estate, to such an extent, that 27,000 cocoons were set apart last autumn for the production of healthy and acclimatised eggs. In reply to an inquiry as to his method of rearing this valuable silkworm, he stated that he was the possessor of certain secrets which enabled him to rear the worm with certainty, but which he declined to part with, except for a pecuniary consideration. Specimens of his cocoons and silk will shortly be in my possession, and will be submitted for inspection at the offices of the Silk Supply Association. In England, the experiences of raising this silkworm, in 1868, resulted in failure, chiefly owing to the hot summer. In 1869, failure again ensued, chiefly from the cold months of May and June. In both years cocoons were obtained only from worms that had been reared indoors. The experiences of the past three years seem to prove that the comparatively cool and moist climate during June and July of our western and northern coasts, are better suited to the culture of the *Yama mai* than the dry hot temperature of the southern and eastern counties. Thus, in the south of Ireland, in Wales, Herefordshire, and western part of Scotland, a much greater amount of success has been recorded than elsewhere. It is also found by experience that they do best in a freely ventilated room, shaded from the sun, the temperature about 70°, equable, and rather moist. Sunshine and a dry heat of 80° seem highly injurious. Great cleanliness is essential. I incline to the belief that the experience of a few more seasons will indicate to us the limits of temperature and locality wherein the worm may be successfully acclimatised, and that it eventually may become a denizen of Great Britain.

SOUTH KENSINGTON MUSEUM.

Many changes have been taking place at this museum recently, and certain classes have been re-arranged and brought into a better state of arrangement for purposes of study. All the electrotypes which, from time to time, have been produced, are now collected at the upper end of one of the south courts, and form an excellent display. At the other end of this same court are the musical instruments, of which a learned catalogue is in the press, and will be shortly issued. Under the cloisters, and near the refreshment corridor, some interesting bits of wood-carving, removed from certain old houses which were demolished to make way for the Carey-street law courts' site, are erected. A cabinet of inlaid work, the design of which is ascribed to Holbein, and which was possibly the property of Henry VIII., is placed in this section. Lower down, and nearer the art library, is a court devoted to textile fabrics, of all nations and times. This collection includes the famous cope of the abbots of Lyon. In the great north court, new plaster casts have been erected, viz., of P. Visschers' shrine, at Nuremburg, and of a monument of St. Peter the Martyr. In the Oriental courts, the disposition of the cases has undergone revision. The collection of enamels, lent by the Rev. J. O. Stephens, is especially worthy of notice. Some of the shapes of the utensils are very unusual and remarkable. Two tall, dark blue vases, with a floral design almost Persian in character, are very fine.

In a corner of the Oriental courts, near the eastern staircase, has been erected a small decorated room of the Louis XVI. period. This boudoir contains specimens of the works of the principal decorative artists of that period. At the commencement of 1869, it was scarcely anything better than a series of very dusty panels and lunettes, finding the meanest of shelter in an outhouse of the shop of a Parisian art-dealer. Previous to his possession of it, or rather inheritance of it from his father, it had formed a portion of the house of Madame la Marquise de Serilly, to whom it was presented by Marie Antoinette. The attention of the South Kensington direction was called to it, and finally negociations resulted in its passing into the hands of the British nation upon the payment of £2,100. It was found necessary to clean it, and carefully revivify the gold mouldings, &c., before it could be exhibited. The extreme length of the boudoir, from the recessed window to the recessed door, is 14 feet, while its width, from the mirror to the window opposite, is 10 feet. In the painting of the panelling throughout the room, are choice examples of Boucher's and Fragonard's work. The figures about half-way up the panels are in relief, and are gilt. They are in pairs, and form a series typical of the four seasons of the year. At the sides of the panels, above the figures, are imitation candles, also in relief. The surface generally is covered with elegant arabesques, and wreaths, and garlands of fruit and flowers. The mouldings are very good. Panels of carved circles, turning one into the other, run round the boudoir, and are painted over with garlands of grapes, or corn, or flowers, according to the season of the year represented in the decoration. The panels of the recesses contain representations of "Endymion" and "Diana," "Venus," and "Mars," most likely the work of Boucher. The centre of the ceiling is filled by a circular painting, by Natoire, of "Jupiter;" over the windows, door, and mirror are lunettes of "Juno" and "Neptune," "Pomona" and "Vulcan," also by the same artist. The mirror stands upon the mantel-piece. Two caryatids, composed of bearded old men drawing a many folded cloak over their heads and shoulders, are fine pieces of white marble sculpture by Clodion. The brass mouldings and frieze of holly leaves are the work of Gouthier.

At present, temporarily, are placed inside the boudoir some Sèvres vases, lent by Lord Dudley; and some Louis XVI. furniture.

Upon the other side of the south courts of the museum will be found an interesting, though small, collection of drawings, bequeathed, in addition to the extensive library of most valuable dramatic publications, by the Rev. Alexander Dyce, to the museum. The drawings are arranged, at present, according to schools. The Italian school comprises sketches by Leonardo da Vinci, Caracci Parmeggiano, Raffaelle, Titian, Zuccaro, &c. The Dutch and German schools contain works by Vandyck, Albert Durer, Vander Meulen, Eckbout, Rembrandt, Rubens, &c. The French school is not so well represented; there are but a few works by Boucher, Claude, and Greuze. In the English section will be found paintings and drawings by Cozens, Stothard, Gainsborough, Flaxman, Turner, &c.

Before concluding, some mention must be made of the collection of peasant jewellery, now placed in the gallery of the South Court. This collection grows continually, and the French fisherwomen's crosses and earrings make good suggestions for light jewellery. The ancient enamels and crystals, and other objects closely allied to these classes, are now shown in what is called the Prince Consort's Gallery, running the length of the centre of the South Courts.

CHINESE INDUSTRIES.

Great interest has been excited by a work published in Paris, with the title of "Industries Anciennes et Modernes de l'Empire Chinois;" it is the joint work of a man of letters and a man of science. M. Stanislaus Julien, professor of Chinese at the college of France, has selected and translated all the most interesting passages relating to manufactures that he could find in Chinese works; and M. Paul Champion has visited China, and, by dint of perseverance and tactics, has succeeded in witnessing many of the most important or most curious manufactures of the country in operation. He made his way, after much trouble, into a manufactory of gongs and a foundry; he saw the elaborate processes of manufacturing and applying the famous Chinese green, produced from the bark of the buckthorn, and he witnessed the production of cloissonné enamels, and many other special Chinese manufactures.

In one respect, M. Champion's opinion differs from that of most visitors to China. He believes that the power of producing nearly all objects of art is the same as it ever was; although he admits that it is not in all cases, as in that of cloissonné enamels, carried on to any extent. M. Champion, however, says nothing of the porcelain manufacture, which he does not seem to have seen, probably on account of the jealousy of the authorities. He brought back to France with him samples of the various kinds of metallic alloys, bronzes, &c., in use in China, enamels, and other productions, and the careful analysis of these at the mint and in other public establishments, supply very interesting information.

The subjects which are most fully and satisfactorily treated in the work are:—Fuel; colours, mineral and vegetable; metal working; varnishes and lacquered work; agriculture; paper, printing, and cognate matters. From the last-named division, we propose to make a few extracts.

The oldest known records are inscribed on very thin slips of bamboo, carefully dried by artificial heat. Many of these are preserved in the pagodas. At a later period, the Chinese made use of a peculiar kind of silk, called silk paper; and, finally, both were replaced by an inventor named Tsaï-lun, who made use of the bark of certain trees, hemp, rags, old nets, &c., which he boiled down to a pulp, and thus produced paper proper. The results of this invention were presented to the Emperor of China, about the year A.D. 153.

The principal materials employed in the production of paper in the various provinces of China, are hemp, the young shoots of the bamboo, the mulberry tree, the rattan, sea-weed, rice, and wheat straw, silk cocoons, and the bark of the *Broussonetia papyrifera*.

Bamboo paper seems to be the most important of all, and its manufacture is thus described by M. Champion. In the month of June, the bamboos, which are on the point of producing new shoots, are cut down and divided into lengths of six or seven feet each. These pieces are placed in a pit dug in the earth, and kept constantly full of water, and remain there for one hundred days or more; they are then beaten with a mallet, to remove the green bark which covers their surface. The bamboo, thus prepared, is boiled in a large wooden vessel full of water containing slacked lime, and placed within a metal boiler. The fire is generally kept up for eight days, and at the expiration of that time, the fibres are taken out and carefully washed; they are afterwards plunged in a lye made from wood ashes, and then laid in a boiler covered an inch thick with ashes from burnt rice straw, when water is added, and the whole is boiled; these last operations are repeated in rotation during ten days. By this time the fibres begin to rot, and they are then pounded in large mortars, the stampers or pestles being generally moved by water-power in a very simple manner. When reduced to pulp, it is placed in vats, and a liquid added, which is supposed to contain chlorine, to whiten the mass.

The sheets of paper are formed in the same manner as in Europe, but the frame is composed of woven fibres of the bamboo instead of wire; when formed, the sheets are laid one upon another upon a table, till a heap of about a thousand is produced, when a plank is laid on the top, and pressed down with great force by means of cords passed round the table, and the paper is left to drain. The drying is achieved by placing the sheets, one by one, by means of a brush, on the outer surfaces of a hot stove built of brick.

After bamboo paper, the most important kinds are:—Yellow hemp paper, used since A.D. 715, for imperial decrees; paper for the sacred Boudhist writings, covered with the juice of the *Pterocarpus* flowers, to preserve it from insects; paper in sheets twenty feet long and very thick, supposed to be made by spreading the pulp on tables covered with felt, or some other absorbent material, a method followed in Japan; Corean paper made of silk cocoons; white hemp paper, used for edicts and other documents; corean paper made from pine bark; paper made from silk waste, much esteemed; from the roots and bark of the mulberry-tree; and, lastly, silk paper, made from the bark of the *Broussonetia*. This last-named paper is made from the bark of the young shoots, mixed with 40 per cent. of bamboo fibre, and boiled in water mixed with lime, until entirely disintegrated; rice straw is also sometimes added, from which fact has possibly arisen the name in use in Europe; the bark of the *Hibiscus rosa sinensis* and of the mulberry is also used in the same way.

Some of the Chinese, and especially the Corean papers, are smooth on both sides; this dress is produced by first polishing the surfaces with dried leaves, and afterwards pressing it by means of heavy rollers moved by hand.

The sizing of the paper is managed in various ways, but some of the papers made from the bark of trees, or from resinous plants, require no addition of size. One mode of sizing is to steep gelatinous rice in water for twelve hours, then to crush it, and to add to the syrupy liquor produced a certain amount of the flour of oleaginous peas (*Dolichos*), containing 16 per cent. of oil. When the mixture is thoroughly homogeneous, a little yellow wax and alum is added, and it is then laid on the paper with a brush, and left to dry in the shade. Sometimes the sizing is produced with the black seed vessels of Chinese bean (*Mimosa fera*), which are steeped in water for twelve hours, and then boiled; the liquor thus obtained is filtered, and then passed over the paper, which is dried in the open air; finally, a solution of alum is added, to cause the paper to take colours. Other vegetable juices, mixed with alum, are used for the same purpose.

The paper used in place of glass for windows is mostly made in the Corea, and is often of large size, and as strong as a thick fabric. It is generally rough, but sometimes well-glazed, in which case it is worth sixpence or more per square yard. This paper is submitted to the action of steam, and then dressed with a mixture formed of oils of *Sterculia tomentosa* and of hemp seed, mixed with white lead and castor-oil seeds. The paper used for covering umbrellas is prepared much in the same way, and resists the effects of rain and sun for a long time. Finer sorts are made of the *Broussonetia*, or silk paper, and are light as well as durable.

The Chinese understand the use of rags in making paper, and have practised it in certain districts when other materials were scarce; they also collect and use up waste paper.

It is to be remarked that, for eighteen centuries, the Chinese have used in paper-making various fibrous materials which we have only sought for during late years, as a substitute, entirely or in part, for rags. It must be remembered, however, that the Chinese are far less particular as to the colour or even the texture of their paper than we are.

Educational Notes.

A London branch of the National Education League has been formed, of which Sir Charles Dilke, Bart., M.P., is chairman. Communications to be addressed to the Honorary Secretary, Mr. Herbert Fry, 24, Suffolk-street, Pall Mall.

An abstract of the Education Bill, proposed by the League, is given in another column, but its provision may be briefly summed up as follows:—

1. Local authorities shall be compelled by law to see that sufficient school accommodation is provided for every child in their district.
2. The cost of founding and maintaining such schools as may be required shall be provided out of local rates supplemented by government grants.
3. All schools aided by local rates shall be under the management of local authorities, and subject to government inspection.
4. All schools aided by local rates shall be unsectarian.
5. To all schools aided by local rates admission shall be free.
6. School accommodation being provided, the State or the local authorities shall have power to compel the attendance of children of suitable age not otherwise receiving education.

With reference to the provision for compulsory attendance at schools, in a discussion at a recent meeting of the Manchester Education Bill Committee, it was urged by Mr. Francis Taylor and by Mr. Jacob Bright, M.P., that although the course formerly adopted, of framing these provisions as amendments to be introduced into their Bill in committee, might lead the House to believe that the promoters regarded them as of secondary importance, no such objection would lie against introducing them in a separate and parallel Bill. In the possible event of the government announcing an education measure in the Queen's speech, it was thought that no other Bill could be seriously pressed, while a separate compulsory measure might still be urged on the House, and a general discussion taken on the policy of compulsion, sufficient to show the government what was the real feeling of the country.

Mr. J. S. Mill, in a letter which was received too late to be read at a recent meeting of the Greenwich branch of the League, says that "the education movement is going forward with a rapidity which justifies the most sanguine hopes, and the two great principles of the League, that elementary education should be compulsory, and that State education should be undenominational, are striking root deeply into the mind of the nation." Having held the first opinion for many years, and the last always, Mr. Mill heartily rejoices at the progress both are making towards general recognition.

On the occasion of the distribution of prizes and certificates to art-students in the Westminster-bridge-road, Mr. R. Applegarth pointed out "the impossibility of English workmen getting as good a scientific education as foreigners, because they had not the same means of obtaining elementary instruction. It was this want of education which placed the English workmen at a disadvantage as compared with foreigners, and this was the real cause why trade left this country, and why we were unable to compete with foreigners. Even now, all that the Science and Art Department was doing only touched the adults, and it was most important that means should be adopted for giving scientific education to lads. To attain this, we must establish a system of compulsory elementary education; and then children, as they grew up, would be ready to receive a scientific training, and might pass from one grade of school to another, until they reached the highest position which they were qualified to fill."

A belief in the paramount importance of the study of science, and other matters of a practical character, as compared with the old routine in which classics formed the main element of education, is certainly gaining ground rapidly. Mr. H. B. Sheridan, M.P., in a recent speech at Dudley, says that, in his opinion, a high classical education is not necessary in order to secure success in life. He thought the study of modern languages would be a great deal more useful to the young men of the present day. He quite concurred in the opinion that sufficient attention was not paid to the writing of the rising generation. At the great schools especially, little attention was paid to it.

It appears that the religious difficulty in schools, which seems gradually vanishing in this country, has been recently revived in the United States. The Roman Catholics insist that the Bible shall be excluded. The Protestants refuse to yield to this demand, and the *New York Tribune* thinks that a religious agitation is to be apprehended, "which will far exceed the pro and anti-slavery war; an agitation which will rock our fabric of popular government to its foundation." In the hope of averting this calamity, the *Tribune* recommends the remitting all religious "inculcation" to the parents and pastors; very much the plan recommended by the Education League.

The education of women is now receiving increased attention in various quarters. Some distinguished members of the University of Cambridge, feeling that that town offers exceptional facilities, have formed a committee of resident members of the University engaged in tuition, and have adopted a scheme of arrangements for lectures to women during the ensuing Lent Term. This committee comprises Professors Adams, C. C. Babington, Cayley, Liveing. and Maurice, and about twenty gentlemen, fellows and tutors or lecturers of their respective colleges. The lectures will comprise:—English History, English language and literature, Latin, Greek, German, French, algebra, and the principles of arithmetic, practical arithmetic, geometry, logic, political economy, botany, geology, and physical geography, chemistry, harmony, and thorough bass, and the theory of sound in its application to music. The fee for a single course of lectures will be one guinea, and any women having attained the age of 17 are eligible for attendance.

The movement for female education also extends to India, and in spite of the difficulties attendant upon the establishment of female schools in that country, the progress made in the Bombay presidency is full of hope for the ultimate success of the work. According to tables recently published, the following comparison between the results of the two past years is obtained:—

Schools.

	1867-8.		1868-9.
Government	97	..	141
Aided	15	..	22
Inspected	30	..	33
	142		196

Scholars

	1867-8.		1868-9.
Government	3,458	..	5,427
Aided	1,393	..	1,874
Inspected	1,413	..	1,297
	6,264		8,598

Especially worthy of notice is the establishment of twenty-two girls' schools in Scinde, where last year there were none.

Special provision is made for the scientific instruction of women in the Massachusetts Institute of Technology at Boston, which has now been in operation for several years, and includes a technical school, or school of applied science, where instruction is given in mining and metallurgy, mechanical and civil engineering, building and architecture. Besides these professional courses, there is a general course in science and literature. The course of study is four years, the requisites for admission being, as to age, sixteen years, and a satisfactory examination in arithmetic, algebra up to quadratic equations, plane geometry, English grammar, and geography. There are also free annual courses open to either sex, and this is believed to be the only school in the United States, and probably in the world, whose laboratory is open to both sexes, for systematic courses of chemical manipulation and instruction. There are 52 desks or tables in the laboratory, more than half of which are said to be commonly occupied by females.

Lord de Grey has selected Sir F. Sandford, Under Secretary of State in the Colonial Office, to succeed Mr. Lingen, as Secretary to the Committee of Council on Education.

NATIONAL EDUCATION LEAGUE.

The following is a synopsis of the Education Bill prepared by the Executive Committee of the League:—

1.—School Districts and School Boards.

Boroughs and towns locally governed to be formed into school districts. Local governing bodies, if elected by ratepayers, to appoint School Boards, partly or wholly from their own bodies, to carry out the Act.

In rural districts and places where there are no local governing bodies elected by ratepayers, unions or groups of unions to be taken as the area of school districts, and School Boards to be elected by ratepayers in parishes, in the same proportion as guardians of the poor.

Boundaries of school districts to be altered, or new districts created in counties, by sanction of the Committee of Council, on memorial from inhabitants.

2.—Powers of School Boards.

School Boards to see that a sufficient number of efficient schools are provided in their districts. To have compulsory powers for the purchase of school sites. To establish and maintain ordinary day schools, and, where necessary, certified industrial schools. To enforce the Industrial Schools Act in regard to vagrant children. To make and keep registers of all children of school age in their district, such register to be founded upon the register of births, and to be periodically revised. For these and all other purposes of the Act, School Boards to have power to levy rates for education, to be collected by overseers with the poor-rate on precept of School Board.

3.—National Rate Schools.

To be managed by School Boards, or by committees appointed by them. To be of various grades, provision being made to enable children to pass from lower to upper grades, but no provision to be made out of the rates for the maintenance of scholars. National Rate Schools to be free to all.

No creed, catechism, or tenet peculiar to any sect shall be taught in any National Rate School; but the School Board shall have power to grant the use of the school rooms, out of school hours, for the giving of religious instruction, provided that no undue preference be given to one or more sects, to the exclusion of others. But the rooms shall not be granted for purposes of religious worship. The School Board shall have power to permit the reading of the Scriptures in schools, provided that no child shall be present at such reading if his parents or guardians disapprove; that the time for giving such reading be immediately before the commencement or immediately after the ordinary school business, and that it be so fixed as that no child be thereby in effect excluded directly or indirectly from the other advantages which the school affords. All books used in the school must have the approval of the School Board.

4.—Compulsory Attendance.

All children to be required to attend school from six to 14 years, subject to provisions of Factory Acts. Number of attendances to be fixed by the Committee of Council, but not to be less than 200 yearly of two hours and a half each for full-timers, and of 100 of two and a-half hours each for half-timers.

In rural districts (to be defined by Committee of Council) attendances to be at such times as may be settled by School Boards, with consent of Committee of Council.

Children to be deemed to attend school if they attend (1) a National Rate School, (2) any school receiving government grants, (3) any private school or private tuition considered satisfactory by School Boards, (4) Reformatory School, (5) certified Industrial School, (6) or a parish (workhouse) school. Any private school not considered satisfactory to School Board to have right of appeal to Committee of Council.

All schools, whether under government inspectors or not, to keep registers of attendance, to be open to inspection by a visitor of the School Board, or by the government inspector of the district.

School Board to appoint a school visitor, or visitors, to examine attendance-books of National Rate Schools, and report to School Board cases of total omission or irregular attendance.

School Board, or committee appointed by the Board, to sit at stated times to receive reports and hear complaints; to have power to excuse absence or irregular attendance in cases of sickness, or on such other grounds as may be satisfactory to them.

If the reasons assigned for absence are unsatisfactory to School Board, the school visitor shall serve upon the parents or guardians the notice A in the schedule of the Act. If, after 14 days' interval, the order of the Board is not obeyed, the school visitor shall serve a second notice, in the form B in the schedule, summoning the parent or guardian to appear before the School Board, or a committee appointed by them, to explain the cause of neglect. Such Board or committee may dismiss the offender with a caution, or may direct the school visitor to summon him before a justice of the peace for infringement of the Act. On a second summons before the School Board they shall direct a prosecution at petty sessions, such prosecutions to be conducted by the school visitor.

The justices may caution or fine the offender on a first conviction. On a second conviction they shall inflict a fine, without costs, of not less than 1s. nor more than 5s. On subsequent convictions such fines may be increased by addition of 5s. to not more than 20s. The fines to be paid to the School Board, to the account of the school fund, and expenses of prosecutions to be defrayed out such fund. Persons convicted by justices to have a right of appeal to quarter sessions.

5.—Existing Schools.

School Board to have power to negotiate with trustees and managers of existing schools for purchase and transfer of buildings to School Board.

Managers or trustees of existing schools may apply to have their schools converted into National Rate Schools; and if such conversion is approved, and the managers undertake to fulfil all the requirements of the Act, the School Board may appoint such managers to be the school committee.

In places where there is sufficient accommodation provided by existing schools receiving government grants, the School Board shall have power to send children, provided the managers are willing to receive such children, and to undertake that no creed, catechism, or tenet peculiar to any sect shall be taught to them, unless the parents or guardians have signed a form desiring that such teaching shall be given. And whenever the Board shall send children to the existing schools receiving government grants (subject to the above-stated provision as to religious teaching), the Board shall pay out of the school fund a proportion of the total expense of the school, equivalent to the proportion which the children so sent bear to the total number of scholars, provided that such number in no case exceed one-third of the number of the whole. Schools receiving this payment shall receive the present allowance from government on the remaining children.

Existing schools under government inspection admitting all children free, and arranging their religious teaching in such a manner that it may be at a distinct time, either immediately before or after ordinary school business, and the attendance at such religious teaching shall not be compulsory, and that there shall be no disability for non-attendance, shall receive two-thirds from government. But any portion not exceeding one-half, may be withdrawn if the inspector reports unfavourably.

6.—Provision of Funds.

Expenses of School Boards to be defrayed in the proportion of one-third by local rate, and of two-thirds from the Consolidated Fund. Government grant of two-thirds for maintenance of schools to depend, as in the case of existing schools, upon the results of examination by government inspectors.

Whenever the inspector appointed by the Committee of Council shall report unfavourably of the condition, management or efficiency of any National Rate School, the Committee of Council may withhold any portion of the government grant, not exceeding one-half of the whole, until such time as the school shall be placed in a satisfactory condition and so reported by the inspector. And in such cases the amount withheld shall be provided by the District School Board out of the rates for the year, and the School Board shall, if necessary, levy an additional rate for this purpose. But if the School Board disputes the justice of the report of the inspector, they may demand a second inspection, which shall be conducted by a special inspector, who shall be appointed for such purposes by the Committee of Council, and shall be called the Inspector of Appeals.

Borrowing powers to be conferred upon School Boards, with consent of Her Majesty's Treasury. Accounts to be audited yearly by government auditor, and published.

7.—Powers of Committee of Council.

In school districts where no School Board is elected within three months after the passing of the Act, the Committee of Council shall appoint a Board to act as the School Board.

If the School Board of any district fails to provide sufficient school accommodation within a reasonable time, the Committee of Council shall require the School Board to provide such accommodation within a specified time, being not less than six months from the date of such precept. If the School Board fails to comply, the Committee of Council shall lay before Parliament a minute voiding the election of the School Board; and unless this minute is disapproved by Parliament within 40 days, the Committee of Council shall declare the election void, and shall appoint a new Board.

8.—Miscellaneous.

Committee of Council to establish and maintain normal schools, for the training of teachers for National Rate Schools. No creed, catechism, or tenets of any sect to be taught in such schools.

Government school inspectors to assist in carrying out the provisions of the Act, and to report to Committees of Council on the efficiency of every school in their district. Copies of such reports to be furnished to School Boards.

Committee of Council report annually their proceedings under and in reference to the Act."

CERTIFIED REFORMATORY SCHOOLS.

THE PHILANTHROPIC SOCIETY'S FARM SCHOOL, REDHILL.

By George C. T. Bartley.

The class of schools considered in the following paper is one very closely allied to the certified industrial schools, of which an account appeared in the *Journal* of the 27th November last, the essential difference being, that the reformatory school is for children who have been convicted of an offence punishable with penal servitude or imprisonment, whereas the industrial school endeavours to rescue those who are bordering on crime, but who have not yet been convicted.

These schools are under the direction and inspection of the Home Office, and are now based chiefly on the Reformatory Schools Act of 1866, which was passed on the same day and as a companion to the Certified Industrial Schools Act of that year. The same inspector visits both sets of schools, and his two reports are issued in one blue-book, prepared annually by the Home Office.

Any reformatory school, established for the better training of youthful offenders, may apply to the Home Secretary to become a certified reformatory school. After it has been inspected by the reformatory school inspector, and reported on as fitted for the reception of youthful offenders, the Secretary of State may grant a certificate, and the school is then eligible to receive children under the 1866 Act. When thus placed under the Home Office, alterations and changes in the rules require the sanction of the Secretary of State, and the certificate may be withdrawn, should it be considered that the regulations are not properly carried out.

The conditions of the commitments of children to reformatory schools is laid down in the act above referred to. By this, any offender, who, in the judgment of the magistrate or court before whom he is charged, is under the age of sixteen years, and who is convicted of an offence punishable with penal servitude or imprisonment, and is sentenced to be imprisoned for at least ten days, may be sent, at the expiration of the period of imprisonment, to a certified reformatory school, for at least two, and not more than five years. Children under ten years of age are, however, not to be sent to such a school, unless they have been previously charged with some crime punishable with penal servitude or imprisonment, or unless they have been sentenced in England by a judge of assize or court of general or quarter sessions, or in Scotland by a circuit court of justiciary or sheriff. This is to prevent very young children, who have been led astray for the first time, from mixing with older and more habitual offenders.

Regulations in the act provide for children being sent, as far as possible, to schools conducted in accordance with their religious persuasion, and, where this is not practicable, ministers of persuasions different from that of the school may visit the children, at specified and convenient hours, for the purpose of imparting instruction in the principles of their religion.

The number of these schools, up to the end of 1868, was 64, that is, 36 for boys and 14 for girls in England, 8 for boys and 6 for girls in Scotland, containing 6,248 children, made up as follows, viz.:—In Protestant schools, 2,967 boys and 694 girls in England; 781 boys and 187 girls in Scotland. In Roman Catholic schools, 1,052 boys and 186 girls in England; and 272 boys and 109 girls in Scotland.

The number admitted, during the year 1868, to all the schools was 1,649; that is, 1,319 boys, and 330 girls; and the per-centages of the ages of these children was as follows:—

	Boys.	Girls.
Under ten years	1·28	·60
From 10 to 12 years	15·69	15·15
,, 12 to 14 ,, ...	39·27	39·09
,, 14 to 16 ,, ...	43·74	45·15

The criminal status of these children is shown by the number of previous convictions. It stood thus:—

Per-centage.

	Boys.	Girls.
Not before convicted	48·82	77·27
Once ,, ,, ...	34·34	17·87
Twice ,, ,, ...	11·06	3·03
Three times ,, ...	4·09	1·51
Four times ,, ...	·83	·03
Five times and upwards....	·83	—

From this, it would appear that the average age of the girls is greater at entering the schools than that of the boys, but that, nevertheless, their criminal status is considerably lower. It is an interesting fact to note the difference in the criminal status of the children admitted in 1868 with those admitted in 1858, as shown by Mr. Sydney Turner's interesting report:—

Category.	Number actually committed in 1858.	Number in each category which would have been admitted in 1868, if the scale of 1858 had been preserved.	Number actually admitted in each category in 1868.
Not before convicted ..	395	646	899
Once................	311	508	512
Twice	148	242	156
Thrice	70	114	59
Four times and upwards	85	139	23
Total	1,009	1,649	1,649

There can be no doubt, therefore, that the intensity of the crime in the juvenile offenders has decreased, though, unfortunately, the total number of such reprobates under sixteen years of age has considerably increased since 1860, as will be seen from the following table, giving the number of juvenile offenders under 16 years of age:—

Years.	England and Wales.	Scotland.	Total.
1860	8,029	1,062	9,091
1861	8,801	1,212	10,013
1862	8,349	1,120	9,469
1863	8,459	1,075	9,534
1864	8,857	1,036	9,893
1865	9,640	1,041	10,681
1866	9,356	1,061	10,417
1867	9,631	1,070	10,701
1868	10,079	1,186	11,265

In England and Scotland together, the number of criminals under sixteen, to that of adult criminals, is about in the proportion of one to fifteen; but in England and Wales alone, it is as one to thirteen, whilst in Scotland, but one in twenty-two. It is much to be regretted that, of these 11,265 criminal children under sixteen, only a little over half, that is, 6,248, are in a reformatory school.

The regulations concerning the license system at the reformatories are similar to those in force at the industrial schools. In 1868, there were 749 boys and 78 girls thus satisfactorily disposed of.

The remarks made concerning the advisability of combining industrial schools into larger institutions apply equally to these reformatory schools. Comparatively few provide for more than 100 children; the largest, that at Redhill, containing 280. The average number of children to each officer is a little over nine, but in many places this is largely increased. The fluctuations in the staff show that a more complete organisation would be desirable and economical. Thus, for instance:—

Schools.	Number of children.	Number of officers.	Number of children to each officer.
Monmouth	19	3	6·3
Dorset	42	3	14·
Hants	54	7	7·7
Liverpool Farm	111	9	12·3
Kingswood	125	11	11·3
Brook-green	131	11	11·9
Wandsworth	134	14	9·5
North-Eastern	157	13	12·
Market Weighton	211	18	11·6
Mount St. Bernard	258	23	11·2
Redhill	280	33	8·4*

In a similar manner the fluctuations in the cost per head vary quite out of proportion to the expensiveness of the locality, being as low as £11 6s. 6d. at Toxteth-park, Liverpool, with 48 girls, and as high as £37 18s. 9d. in Glasgow, with 129 boys. Even deducting the somewhat exceptional loss on the industrial work of £5 7s. 1d. per head, the charge of this latter institution is still as high as £32 11s. 8d.

Considering that the large part, if not all, the cost of these schools falls on the public, as the income is derived in a similar way to that of the industrial school, and as the children are not liable to be removed when once convicted, it would seem clearly advisable to concentrate these establishments in cheap and healthy neighbourhoods. It is reasonable to suppose that, if at Toxteth-park with 48 children, each costs but £11 6s. 6d., large institutions of 1,000 children or more might be done at the same, or even at a slightly less cost. The average cost for all the reformatory schools is £18 19s. 10d. per head, and were this, by some better organisation, reduced to, say, £11 19s. 10d., which is considerably more than Toxteth-park costs, a saving of no less than £43,736 would be effected, sufficient to provide for 3,740 more children than are at present benefitted.

The results of the schools, as indeed is found invariably the case with institutions combining mental and physical training, are highly satisfactory. Of the 11,402 children discharged up to the end of 1868, only 554, or 4·8 per cent., were re-convicted. Here, again, great differences exist in different schools. Thus:—

Of the boys—

At the Monmouth school 16·6 per cent. were re-convicted.
„ *Clarence* ship.... 15 „ „
„ Parkhead school 14·6 „ „
„ Leeds .... 11 „ „
„ Glamorgan .... 10·2 „ „
„ Berks .... none „
„ Sunderland .... none „
„ Hants .... none „
„ Leicester ...... none „
„ Northampton .. none „

Of the girls—

At the Dalry school 12 per cent. were re-convicted.
„ Paisley .... 8·8 „ „
„ Rescue .... none „
„ Ipswich.... none „

It is also found that fewer girls are re-convicted than boys, the figures being:—

	Boys.		Girls.
England	4·41	..	2·96
Scotland	8·37	..	5·5

And also that the Scotch schools are not so successful as the English, nor do the Roman Catholic institutions have equal results to the Protestant ones, as 7·3 per cent. of the children of the former are re-convicted to 4·2 of the latter.

During the year 1868, exactly 1,300 children were discharged from the 64 reformatory schools, that is, 1,032 boys and 268 girls. Their immediate occupation was as follows:—

	Boys.		Girls.
For employment	31·10	..	47·01
Returned to friends	29·74	..	40·67
Emigrated	9·88	..	—
Sent to sea	15·79	..	—
Enlisted	1·26	..	—
Discharged on account of disease	1·26	..	2·61
Discharged as incorrigible, or to penal servitude	·58	..	1·49
Transferred to other schools	1·74	..	1·49
Died	3·10	..	3·35
Absconded, and sentence expired	5·03	..	3·35

The reformatory school at Redhill must be taken as one of the best, as it is the largest institution of this description. It was founded in St. George's-fields, Southwark, about the year 1790, its principal purpose being to take charge of the children of the criminals executed at the Old Bailey. In those days, it must be remembered that a large number of people were hung for comparatively trivial offences, and consequently the number of children left absolutely destitute was considerable. Of late, the school has been somewhat changed, not only by being moved and converted from an ordinary industrial training institution, into one where farming is the chief occupation, but also in the nature of the children provided for. These are now all, with two or three exceptions, criminals themselves, and not merely the children of such.

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* It should be stated that in this every official is included, even a messenger.

The school farm consists of 300 acres, of which 40 are hired, in a beautiful situation, about a mile and a-half from the Redhill Junction Station, and comprises the chaplain's house, chapel, hall, infirmary, laundry, bakery, and five distinct houses, named Queen's-house, Gladstone's-house, Garston's-house, Waterland's-house, and Gurney's-house. Two of these have been added, by private liberality, since 1849, when the school first commenced work here. Each of these houses contains accommodation for about sixty boys, and is quite a distinct school, having a separate master, and complete accommodation, so that, except for general superintendence and collection at church, the whole institution must be considered as comprised of five different schools.

The mental training of the boys is not gone into very largely, three hours every alternate day being devoted to it; the rest of the time being entirely taken up in industrial occupation. Of the 99 boys admitted in 1868—

47 could neither read nor write.
13 could read only very imperfectly.
23 could read and write imperfectly.
13 could read and write fairly.
3 read and write well.

The occupation of the boys is as follows:—

Field	194	boys.
Cow-house boys	14	„
Shepherds	2	„
Stable	3	„
Garden	10	„
Brickfield	16	„
Tailors	13	„
Stonemasons	11	„
Carpenters	3	„
Blacksmiths	3	„
Bakers	2	„
Bricklayers' labourers	1	„
House-boys	13	„
Laundry	3	„
Cooks' boys	2	„
Total	290	„

The work is done in gangs of boys, under an industrial trainer, who reports every week to the master of the house to which each boy belongs, as to how he has worked, and a payment, varying from 2d. to 4d. is accordingly allowed to each juvenile labourer. This money is kept in a separate account for each boy, who is allowed to spend it on certain articles. He is not permitted to have it in his possession; in fact, so strict is it necessary to be, that no boy may have any money in his possession at all, but must, on pain of forfeiting all his earnings, give up to the master any sum which may be presented to him by friends or otherwise, his account being credited with all such items. Postage-stamps, hair-oil, gloves, treacle for puddings, and expense of holidays, are the usual items of expenditure, the boys' balances varying in amount from a shilling or two to as much as a sovereign. The total amount thus paid the boys for labour was, in 1868, no less than £180 5s. 11d.. On leaving the school for employment, this becomes the property of the boy, but it frequently remains in the hands of the chaplain for some time, being drawn upon as occasion requires. By this means the after history of each inmate is often known for some years. In addition to this pay, an allowance of 1d. a-week is made for each good-conduct stripe. These stripes are awarded to those who, for a certain number of months, are without bad marks, and their names, with the number of months they have been on the good list, is printed on a board, placed over the fire-place in each school. The honorary pay for high-standing, in 1868, was £23 12s. 9d.

The shoes of all are made, and the repairs are done, on the premises, as also the cloth clothes. The socks are purchased, but entirely mended by the boys. The boys do all the washing, the baking, the whitewashing, painting, and repairs, both to the premises as well as to the tools and implements employed on the farm; and every boy, with but very few exceptions, is taught to milk easily and quickly. In all these branches of work the same plan of payment as in the farming is adopted, and works with great success.

Punishments are not so numerous as the class of boys might lead one to imagine; they consist of confinement in a cell, and, in extreme cases, of which seven occurred last year, flogging is resorted to. One great temptation to boys, on their first joining the school, is that of desertion. They have been confined in prison with bars and walls, and when they see the perfect freedom of the open country, they are tempted to run away. To prevent this by supervision would be both difficult and costly; but a simple method of interesting all in stopping anything of the sort answers excellently. If a boy runs away, every one in the school is fined fourpence, and all the costs incurred in recapturing the fugitive are borne by the school to which he belongs. It is argued that no one runs away without his friends knowing of it, and consequently, by each having an interest in preventing desertion, all do their best to stop its occurrence. In 1868, only five cases occurred, which put the boys in the different houses to a cost of £5 5s. 11d.

Fines are also imposed for bad conduct, and the holiday of two days, which is granted to each boy who earns a position by good conduct, and who has respectable friends, is liable to be stopped altogether, or reduced or increased by a day, for bad or good conduct marks. No boy, unless he has a good conduct stripe, is allowed to go off the premises for a message; and by such encouragements, warnings, and appeals to the pocket, which latter are usually the strongest, the discipline of the school is largely maintained, without resorting to severer measures, even with these rough natures. A systematic drill is carried on twice a week, and a good band has been formed among the boys, both of which measures conduce greatly to the improved discipline of the establishment.

The health of the boys is remarkable, the infirmary being used but for eight cases in the year, and no death having occurred among the three hundred children for over three years. The entire drainage is now on the dry-earth system, which answers admirably. When the schools were first started, an elaborate plan of water drainage existed, but this was found so deficient as to lead to the adaptation of the buildings to the earth method, the whole refuse being applied directly to the farm lands.

The cost of the institution is certainly high, amounting to £19 7s. 5d. per head, with but about 4s. 8d. for rent, as the premises, except 40 acres, are free, and after allowing for the profits on the industrial work of £5 1s. per head. The food per week is 3s. 4½d., and the clothing 8¼d., leaving the large sum of over £8 10s. per head for other expenses. The industrial pursuits are all remunerative, but more particularly so that of brickmaking, which is carried on only during the summer months, at a profit, in 1868, of £94 7s. 4d., on nearly 250,000 bricks.

The chief point to consider with these schools, is, after all, their results. Considering all the children have been convicted, some, indeed, many times (in one instance, a boy from London, of from 12 to 14 years of age, who could neither read nor write, no less than ten times), it may fairly be stated that, practically, all the children would, if left alone, be permanent criminals, and be to their deaths at least unproductive burdens, if not destructive agents to society. Consequently, it is not too much to say that all who turn out well are so many thieves converted into useful citizens. In 1865, 1866, and 1867, at the Redhill school 234 children were discharged; 76 emigrated and 158 were disposed of at home. Of these:—

	Emigrants.	Home Disposals.	Percentage on the whole 234.
Had not been re-convicted up to 31st Dec., 1868	93·42	75·95	81·60
Had been re-convicted	5·26	22·15	16·67
Not known..........	1·32	1·90	1·71

Every effort is made to induce the boys to emigrate. In the case of orphans, the difficulty is not great, but of course it is necessary to get the parents' consent when there are any, and in most cases these feel that, by sending their children away, all hope of assistance from them is at an end; the per-centage of failures above given shows that the temptations to boys with their relations are more than four times as great as when removed, in a foreign land, from their evil influences.

The numbers as they stand above, show that 80 per cent. are really reclaimed; and, as the cost per head in the school is nearly £20, the cost of each reclaimed one, so to speak, is £25 a-year; and, as the term at the school averages three years, it follows that each reclaimed lad costs the country £75. Had he been left alone, the best thing that he could have done for the community would have been to remain in the workhouse for, say twenty years, at a cost of at least 7s. per week. He would, therefore, have cost £365; but, in all probability, he would, as a professional thief, have wasted ten times that amount. The reformatory schools, though doubtless capable of improvement and better organisation, are, therefore, evidently effecting a great and most lasting benefit to the community.

Fine Arts.

Prints and their Production.—Members may be interested in knowing that some additional examples of prints produced upon an analogous principle to that described by Mr. Davenport under the title of the "Albert Type," have been added to the colllection which is still on exhibition at the Society's House. The examples added are called "Lichtdruck," or a new mode of photographic printing, introduced by Messrs. Ohm and Gropman, of Berlin. The process is stated to be "capable of yielding any number of impressions, which can be printed upon unprepared paper with equal effect to copper and lithographic prints in distinctness of colour, outline, delicacy, and indestructibility." The process is simple. A plate for printing can be prepared in a short time upon common glass from a negative. The outlay is not costly, as neither gold nor silver preparations are needed. One penny will cover all the expenses in materials to prepare a common-sized plate, and if an impression be taken in the morning, several hundred Lichtdrucks of the finest finish can be ready by evening. The outlay for the peculiarly constructed printing press, and a few minor utensils, is very moderate, and within the reach of any photographer. Any description of paper is adapted for this kind of printing, while for highly-finished prints the inventors use another class of paper, specially prepared by themselves. They are now establishing an academy to teach their new system of Lichtdruck to a select number of pupils at Berlin, and intend to do the same in this country, where Mr. C. F. Jessen, Allemannia-offices, 6, Ship-alley, Bradford, has been appointed agent for the sale and licensing of the process. The seven examples received from Mr. Jessen consist of portraits, architectural and pictorial subjects, a physical map, and an osteological specimen.

Manufactures.

Employment of Girls in French Factories. — Great complaints are made of the severe labour to which children are subjected in the silk-winding establishments of Lyons and other parts of France, and the government is now occupied with a plan of reform. In order to stimulate public opinion on the subject, Dr. Ducaisne gives an account of the regulations of a silk-spinning establishment in Paris, where the labour of children has been carefully adapted to their powers. The following is the doctor's account of the distribution of the day in these works:—The children, girls, are not admitted till they have attained the age of twelve. They rise at five o'clock, make their beds, the elder girls dressing and combing the younger. Prayers in the chapel at half-past five. After the prayers, the elder girls remain for a time in the chapel for meditation. The little ones are taught in classes, and the rest are employed either in house-work or sewing. At half-past six, breakfast, followed by play. At seven, needlework for half-an-hour, the catechism being read aloud, and the girls questioned upon it. From half-past seven to a quarter to twelve they are employed in the factory, after which they have a second meal, listening to a reader during the time, then play again till a quarter to one. Needlework for the elder and reading classes for the rest, till a quarter past two, when they go to the factory again and work till seven o'clock, when evening-prayers take place in the chapel; supper is there served, reading taking place during the time, as at dinner. The day finishes with recreation, in summer, or needlework in winter. The day is thus employed:—

Silk-winding	9 hours.
Needlework	1 „
Primary instruction	1½ „
Household work	1 „
Meals and play	2½ „
Sleep	9 „

The meals are arranged as follows:—Morning, soup and bread; ten o'clock, a piece of bread in the factory; twelve o'clock, soup, meat, and vegetables; three o'clock, bread in the factory; evening, soup and vegetables. Most of the girls are orphans; they are engaged by agreement with a relative, or some one answering for them, till the age of twenty, when they receive a trousseau and a sum of money, varying from £12 to £26, being the amount of the prizes distributed at the end of each year, for industry and good work.

Commerce.

Customs-house Frauds.—For some years past shipments of cases with tobacco linings, and filled up in the interior with rubbish, to make up the requisite weight, have been received in Melbourne from New York, and although these dummy shipments have been consigned to certain firms, the consignments have in every instance been repudiated, as they have been sent to them without their knowledge and consent. The reason of these strange shipments is thus explained:—In New York there is a drawback allowed on tobacco, and in order to obtain it from the Customs of that city, this ingenious plan is adopted. A thin layer of tobacco is sufficient to mislead the American Custom-house officers; and that the swindle on the United States revenue is still perpetrated is evident from the fact that, although the Customs authorities at New York have been communicated with, the shipments still continue to arrive.

Tobacco Culture in Bavaria.—Bavaria produces about one-fifth of the entire quantity of tobacco grown within the limits of the German Customs Union Territory, as will be seeen by the return of the tobacco produced in each of the different States in 1866:—

Baden	243,740	cwt.
Prussia, including the newly-annexed States	222,324	„
Bavaria	135,659	„
Hesse Darmstadt	36,402	„
Wurtemberg	6,760	„
Saxony and Thuringian Duchies	18,533	„
Total	663,418	cwt.

Madder in Holland.—There are in the province of North Brabant 23 stores and manufactories of madder, employing 300 workmen. That of Steenbergen produces 350,000 kilos. of madder pulverised, and 84,000 of roots. In the furnaces there was dried, in 1865, 800 kils. of stripped madder and 36,000 kils. of roots. The manufacture of garancine furnishes annually 42,000 kils. for exportation. The four furnaces in Zevenbergen furnished 170,000 kils. of dry products, and 64,000 kils. stripped bark. The preparation of madder and garancine in Thiel employs only 25 workmen, who are not in a very prosperous position. In South Holland there are 26 manufactories, employing about 207 workmen. In North Holland there are 12 drying stoves; one at Beverwick, which supplies 500,000 kils. of roots; one at Amsterdam, which makes garancine, and which at the same time distils alcohol. It has two steam engines and three boilers, with heating-pipes, which employ 50 workmen; one at Zeipe and one at Schotin, which produced, in 1865, 477,000 kilogrammes, dried in five furnaces. They have tried for the first time to dry madder by steam, and to grind it by millstones, moved by a steam-engine of 10 horse-power. There are in the 44 communes of Zealand 74 furnaces, employing 700 workmen. This province furnishes the principal part of the madder and garancine. There is prepared there annually 10,000 barrels, and 150 kilogrammes of ground madder. The annual yield in Zealand is 6,600,000 kilogrammes of madder roots. It is in the islands of Schowen and Duiveland, and in the zone of land comprised between the mouths of the west Escouit and the confines of Belgium, that they cultivate the best roots, and those most in esteem for their colouring matter. The mean estimate of the yield per hectare is, for the bi-annual plant, 2,000 to 3,000 kilogrammes; for the triennial, 3,500 to 5,000 kilogrammes. Seventy-eight machines, moved by steam, pulverise the madder or dry and beat the roots in Zealand. In 1863, there was delivered 11,000 casks, of 500 or 600 kilogrammes, of pulverised madder, and 1,500,000 kilogrammes of roots. They also make garancine at Middelbourg, Zienkzee, and Goes, where 100 workmen are employed when all the machines are in motion.

Manilla Hemp.—This is obtained from the wild plantain, which is cultivated in many parts of the Philippines, but more especially in the provinces of Albay and Camarines, in the south of Luzon. It is planted in the rainy season, and is propagated with ease in the same manner as the common plantain. A hundred plants occupy about 1,000 square yards of land. The method of preparing the fibre is as follows:—The plant, after having reached the age of between two and three years, is cut down, and stripped of its folds. These are then divided into pieces of three or four inches wide, and the pulpy or fleshy part separated by the process of drawing them under a knife fixed for the purpose. The fibre is thus laid bare, and is then placed in the sun to dry. If the plant be left on the ground for any length of time after it has been cut down, the fibre made from it assumes a reddish tinge unsuited to commerce, the sap changing and discolouring the fibre. Fifty trees produce about 25 pounds of fibre. The total production of this misnamed "hemp" in the Philippines, in 1867, was about 400,000 piculs.

Indigo in the Philippines.—This plant is grown in the provinces of Pangasinan and Illicos. It is sown in November, and the crop gathered in June. Its quality being inferior, owing in a great measure to a want of knowledge of the process of its manufacture, and the profit to the grower being exceedingly small, few care to employ their time in its cultivation. The total annual production of indigo is seldom in excess of 5,000 quintals.

Colonies.

Diamonds in New South Wales.—The *Australian* states that an extensive area of ground has been taken up on the Cudgegory River, New South Wales, the only locality as yet on which diamond mining has been prosecuted on a large scale in that colony. The Australian Diamond Company have so much confidence in their enterprise, that they have resolved on working their gem manufactory by steam, and not long since they dispatched a steam-engine to the spot. A diamond, stated to weigh three carats, was discovered at Sebastopol by a party of mariners. Diamonds have also been found along the greater extent of the Reedy Creek, at Eldorado woolshed, and higher up, at Woorage. Precious stones have also been discovered in New Zealand, and it is expected that some important discoveries will be made.

The Candle-tree in Australia.—Dr. Schomburgk, Director of the Botanic Gardens, South Australia, writes as follows:—I have at last secured and received per mail from Mr. W. Bull, F.L.S., F.G.S., in London, a packet of the celebrated candle-tree (*Parmentiera cerifera*) of Panama. If I succeed in growing the seed and acclimatising the plants, it will probably prove an introduction of importance. This tree is confined to the valley of the river Chagres, Isthmus of Panama, and was discovered in 1866, and introduced by Dr. Siemann to England. He says:—"On entering a forest of these trees, a person might almost fancy himself transported into a chandler's shop. From all the stems and lower branches of these trees hang long cylindrical fruits, of a yellow wax colour, so much resembling a candle as to give rise to the popular appellation, "palo de velas" (candle-tree). The fruit is generally from two to three, but not unfrequently four feet long, and about an inch in diameter. It has opposite bifoliated leaves and large white blossoms, which, in its native habitat, are grown throughout the year, but are in the greatest abundance during the rainy season. Previously, only one species of *Parmentiera pendulus* was known to exist, the fruit of which, called "quamxilotte," is eaten by the Mexicans, while that of *Parmentiera cerifera* serves for food to the numerous herds and cattle.'" Dr. Schomburgk believes there is little probability of success in the open air, except in the moisture of a tropical climate, but in conservatories, where there are the requisite appliances, there will be no difficulty in getting the plants to grow.

Obituary.

Thomas Creswick, R.A.—The Academy has lost another of its members, whose works have become universally known to the frequenters of its exhibitions. Thomas Creswick was born at Sheffield, in the year 1811. He was educated at Hazelwood, near Birmingham, whence he proceeded to London for the purpose of studying art. Mr. Creswick became first known as a landscape painter by his pictures of Welsh streams, which, by their exquisite combination of rock, foliage, and river, excited universal admiration. In 1842, he was elected an associate, and, in 1851, became a Royal Academician.

After this period he produced his greatest works, amongst which may be classed his "England," "The London Road a Hundred Years Ago," and the "Weald of Kent." In 1848, he produced his "Home by the Sands," and "A Squally Day;" and, in 1850, his "Wind on Shore" and "Over the Sands." His "Evening on the Banks of the Thames" was produced in 1867. Some of his works were engraved for Marshall's Annual. Mr. Creswick took an active interest in the early efforts to resuscitate the Society of Arts, and was a member of the Council several years. He died on the 28th inst., at The Limes, Linden-grove, Bayswater, in the fifty-eighth year of his age.

Notes.

Patent Laws.—At a meeting of the Manchester Institution of Engineers, to be held on Tuesday next, the 4th of January, in the Town Hall, Manchester, the subject of the "Patent Laws" will be discussed. Mr. T. Aston, barrister-at-law, will read the opening paper, and the chair will be taken by Mr. John Platt, M.P., at three o'clock. The reading of the paper will be followed by a discussion on the important questions relating to the granting patents for inventions, and the amendments that are needed in the existing laws.

MEETINGS FOR THE ENSUING WEEK.

Mon......Entomological, 7.
Medical, 8.
Victoria Inst., 8. The Rev. J. H. Titcomb, M.A., "On the Origin of the Negro."
Tues ...Pathological, 8.
Anthropological, 8.
Syro-Egyptian, 7½. Mr. W. H. Black, "On the Suez Canal."
Royal Inst., 3. Prof. Tyndall, "Light." (Juvenile Lectures.)
Wed ...Pharmaceutical, 8.
R. Society of Literature, 4½.
Obstetrical, 8.
Thur ...Royal Society, 8½.
London Inst., 7½.
Royal Society Club, 6.
Royal Inst., 3. Prof. Tyndall, "Light." (Juvenile Lectures.)
Fri ......Geologists' Assoc., 8.
Sat......R. Botanic, 3¾.
Royal Inst., 3. Prof. Tyndall, "Light." (Juvenile Lectures.)

Patents.

From Commissioners of Patents' Journal, December 24.

Grants of Provisional Protection.

Bookbinding, sewing apparatus used in—3598—J. G. Tongue.
Bottles, &c., closing and stoppering—3565—C. A. McCalla.
Candle lamps—3606—R. W. Bernard.
Carding machines, &c., feeding—3600—P. C. Evans and H. J. H. King.
Cartridges—3577—W. Downing.
Casks—3561—J. Hamilton and R. Paterson.
Castors for tables, &c.—3608—T. Moore.
Cements—3373—J. Thomlinson.
Door knobs, &c.—3586—T. Moore.
Door knobs, &c., fastening—3287—P. Koch.
Earth closets, &c.—3634—J. Heap.
Electric telegraph cables, &c.—3587—W. A. Marshall.
Electro-magnetic circuits, making and breaking—3620—W. R. Lake.
Fibrous materials, doubling and winding—3612—W. and W. McGee.
Fire-arms—3557—W. Tranter.
Fire-arms, breech-loading—3589—W. C. Green.
Flax, &c., machinery for preparing—3392—S. Cotton.
Friction, apparatus for reducing—3633—J. H. Johnson.
Furnace bars and furnaces—3611—W. Hepple and M. Stainton.
Granaries—3622—E. Johnson.
Hair, tubular apparatus for brushing and wet-rubbing—3531—H. P. de Meyrignac.
Horse shoes, &c., machinery for forging—3523—W. Shanks.
Iron and steel—3604—R. J. Carpenter.
Laths, &c., machinery for cutting timber into—3590—H. Wilson.
Liquids and fluids, forcing and projecting—3529—D. Robertson, W. L. G. Wright, and J. More.
Looms—3609—J. Barlow and E. Pilkington.
Looms—3623—W. K. Stock.
Looms, harness for—3615—W. E. Newton.
Lubricators—3594—J. and J. Turner.
Metals, cutting and boring—3602—W. Asquith, G. Booth, and G. Pickersgill.
Motive-power engines—3585—W. I. Hetherington.
Motive-power engines—3642—J. Outram.
Net machines—3603—H. E. Newton.
Organs, apparatus for blowing—3601—A. Barr.
Packing hoops, &c., connecting the ends of—3567—H. Whittaker and W. Bradbury.
Paper-cutting and folding apparatus—3582—W. E. Newton.
Pipes and conduits—3618—W. C. Homersham.
Portfolio for filing music, &c.—3584—E. Simcoe.
Pumps—3619—N. P. Burgh.
Railway chairs—3553—H. S. Rush.
Railway rails, connecting—3572—T. S. Sarney.
Railway signals and switches, &c.—3574—W. Baines.
Railway wheels—3640—G. Wilson.
Refrigerators—3613—R. Morton.
Rotary engines—3446—G. B. McFarland.
Rotary engines—3616—W. E. Newton.
Rotary sieves—3599—E. A. Cowper.
Screw bolts, manufacturing untapped nuts intended for—3593—P. Koch.
Screw nuts, &c., cutting—3614—P. Parkes.
Seed-sowing machines, &c.—3627—J. H. Sams.
Shell brooches, &c., ornamenting—3573—A. M. Clark.
Ships, propelling—3626—J. Outram.
Ships, propelling and steering—3007—S. Barber.
Ships, propelling and steering—3579—G. White.
Ships, undulating propellers for—3563—J. F. Alexander.
Ships, &c., constructing—3631—G. Seymour.
Ships, &c., raising above the surface of the water—3610—B. B. de Morell.
Shuttle sewing machines—3576—W. Yeoman and J. Gilbert.
Shuttles—3559—D. Clayton.
Sliver or yarn, putting twist into—3592—T. Rawsthorne.
Smoke, &c., consuming—3569—G. F. Logan.
Steam boilers—3588—H. and F. C. Cockey.
Steam boilers, preventing incrustation in—3617—G. W. Honeyman.
Street tramways, &c.—3607—J. Livesey.
Submarine railway tunnels, &c.—3591—W. Williams.
Sunshades and umbrellas—3571—J. Willis.
Tramways—3575—R. J. Ransome, J. Deas, and R. C. Rapier.
Velocipede carriages and vehicles—3638—S. Johnson.
Velocipedes—3570—W. E. Gedge.
Velocipedes, apparatus connected with—3542—C. Wyndham.
Veneers, cutting—3605—J. Gardner.
Waggons, &c., drags for—3629—T. Parry and J. McHardy.
Weaving apparatus—3596—G., J., and M. Oldroyd, jun.
Weighing machines—3644—F. E. Duckham.
Wood-moulding and panelling machines—3628—E. T. Hughes.
Wool, &c., machinery for pressing—3555—W. Johnson.
Woollen yarns, &c., spinning—3632—J. S. Battye.
Worsted, &c., spinning—3568—H. Kershaw.

Patents Sealed.

1617. A. Brooman.
1904. G. Musgrove.
1911. W. R. Lake.
1915. W. Spence.
1919. O. Zabel.
1927. J. Macintosh.
1940. W. Madders.
1947. T. Gray.
1955. G. T. Smith and C. Challenger.
1961. W. Blackburn.
1962. E. T. Hughes.
1963. W. Bartram.
1965. R. H. Courtenay.
1971. D. Hebson.
1980. W. Coleman & S. Turton.
1986. A. Barclay.
1987. L. F. Banks.
1992. T. Jones.
1994. H. A. Bonneville.
1998. G. White.
2019. J. Clark and A. Ewing.
2038. W. Q. East.
2061. I. Williams and . C. Wallendahl.
2063. W. Hutchinson.
2078. T. Kendrick.
2112. A. V. Newton.
2158. E. F. Jones.
2728. S. A. Varley.
2847. H. L. Bolger & J. Meekin.
2859. A. Bodart.
2893. T. Adams.
2896. C. E. Spooner.
2907. E. Tyer.
2930. J. Wallace.
2946. W. C. May.
2955. T. Greenwood & J. Keats.
3070. J. Buchanan.
3086. T. Deichmann.
3093. W. R. Lake.
3114. J. Wakefield.
3120. J. B. Elkington.
3133. M. Clemens.
3218. N. Shaw.

From Commissioners of Patents' Journal, December 28.

Patents on which the Stamp Duty of £50 has been paid.

3382. J. S. Benson and J. von der Poppenburg.
3434. W. Clark.
220. C. Wheatstone.
3417. W. Smith.
18. W. Chippindale.
237. P. Jack, jun., and A. Coulthurst.
3391. E. Allen.
3415. J. E. Brown.

Patents on which the Stamp Duty of £100 has been Paid.

3438. W. Henderson.
3442. R. Lakin and J. Wain.
3482. W. B. Adams.
3453. C. F. Varley.